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בקשה לפטנט  
Application for Patent

אני (שם המבקש, מעני ולבני בוק מאגד - מקום התאגדותו)  
(Name and address of applicant, and in case of body corporate- place of incorporation)

קלמן לזלו, הגר ברחוב סרסיי 18/2; קרית-שפרינזק, חיפה,

Kalman LASZLO, of 18/2 Marseille Street, Kitiat Sprinzak, Haifa,

הנני הממציא בעל אמצאה טכנית  
being the inventor of an invention the title of which is

שיטה משוכללת לעשיית תרבות ניידות  
(בעברית)  
(Hebrew)

IMPROVED METHOD OF MAKING REMOVABLE ORNATURES

(באנגלית)  
(English)

הנני מבקש בזאת כי ינתן לי פטנט על פטנט זה.

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No. 68802 dated 26.05.1982		No. 68802 dated 26.05.1982		
* יאוי סמו כללי / איחוד - רצוף כזה / צד ייגס P.O.A. general/individual attached/to be filed later- filled in case 68802		* יאוי סמו כללי / איחוד - רצוף כזה / צד ייגס P.O.A. general/individual attached/to be filed later- filled in case 68802		
* חשן למידת סמכים בישראל Address for Service in Israel E.A. GLUCKSMAN, P.O.B. 6202, HAIFA		* חשן למידת סמכים בישראל Address for Service in Israel E.A. GLUCKSMAN, P.O.B. 6202, HAIFA		
חתימת המבקש Signature of Applicant		היום 5 בתשרי ארבעים ושמונה 1987 of the year		
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שיטה משוכללת לעשיית תחכוכת ביידות

IMPROVED METHOD OF MAKING REMOVABLE DENTURES

THE APPLICANT:-

Kalman LASZLO,  
18/2 Marseille Street,  
HAIFA.

המבקש:  
קלמן לזלו,  
רחוב מרסיי 18/2,  
חיפה.

BACKGROUND OF THE INVENTION

In my Israeli Patent Specification No. 68802 I have disclosed a method of producing artificial dentures by using hollow posterior teeth. According to this method artificial  
5 teeth are mounted on a denture base by means of wax, using conventional anterior teeth and hollow posterior teeth. The trial denture is placed into an articulator together with the opposite denture in a manner effecting contact between the maxillar and mandibular posterior teeth. After the wax holding  
10 the teeth in position has sufficiently hardened, the articulator position is set to create a narrow space between the respective cusps. The hollow teeth are now filled with wax, and the articulator is moved in various directions to remove any protruding wax portions. The dentures are now placed into the  
15 patient's mouth, whereby more superfluous wax is removed from the cusps of the hollow teeth by masticating motions of the patient. This results in the final shape of one or both dentures, which are now placed in a cast and the wax is melted out by heating. The thus-created hollow spaces, including these  
20 in the hollow teeth, are filled with a liquid plastic material, in a known manner. After curing of the plastics material the denture or dentures are ready for wear.

Although this method of making removable dentures requires less sittings of the patient than before and obviates grinding of the occlusal teeth surfaces in the patient's mouth, it is my object to still improve the method and to shorten the production time, while improving the fit and quality of each denture.

Another object of my invention is to create physiologically formed dentures and teeth with a perfect chewing fit without requiring any subsequent grinding operations in or out of the patient's mouth.

An additional object of my present invention is to reduce the cost of artificial dentures, by reducing the actual working hours, particularly in case of a dental surgeon depending on the services of a dental laboratory not attached to his clinic.

In addition to the drawback of the many stages of the conventional method of making dentures, it has come to my attention that the surface of most dentures does not exactly conform to the contours of the mouth cavity. In spite of the fact that the dentist takes an exact impression of the upper or lower jaw, or of both, the technician does usually not take into consideration the tissue portions surrounding the jaw proper, but casts a denture base in the shape corresponding to the shape of the protruding portions only, while neglecting the muscular

system which should assist in keeping the denture in position, especially the mandibular denture. In fact most mandibular dentures are held in position by their weight only and, during chewing, by the pressure of the maxillary denture.

5           With the object of making a denture which should encompass the entire mouth contour, I have invented the following, non-conventional method, which includes preparing a final denture base, and placing the artificial teeth onto the ready base, instead of casting both base and teeth in a cast as a  
10 complete unit. This method has the great advantage of obtaining a true base which adheres to all parts of the jaw, in contradistinction to the conventional method, which requires major adjusting and grinding operations of the denture plate after its completion.

15                           SUMMARY OF THE INVENTION

          The method of making a denture base according to the present invention comprises: making a correct impression of the edentulous jaw and using it for preparing a positive plaster cast in a conventional manner. Preparing two identical,  
20 provisional base plates by vacuum-forming of a thermoplastic sheet, also in a conventional manner. The characteristic step of the invention consists in making a plaster die by using as a

pattern the two identical, provisional base plates in contiguous alignment, resulting in a trial denture base of sufficient thickness. This denture base is prepared from a transparent or translucent material, permitting the dentist to discern the marks  
5 of the crestline and the papillas in the mouth and on the cast.

The following step comprises the making of a pattern for the plaster die of the final base plate by using the trial base for obtaining a complete, true impression of the gums and the surrounding tissue in a known manner, by adding sufficient thermo-  
10 elastic material to the translucent base plate. This pattern is now used to make a plaster cast, whereby all undercut portions are filled with a rubber compound or the like elastic material to facilitate withdrawal of the completed plate after pressing. The plaster cast is furthermore characterized by its being divided  
15 into a lower portion reaching up to the widest-extending parts, i.e. the equator of the pattern, an intermediate portion surrounding the upper rim, and an upper portion. In this manner the final base plate is formed true to the mouth contours as defined by the last impression.

20 The final base is now provided with a thermo-elastic occlusal rim, again in a conventional manner, and the opposite denture bases are placed in the patient's mouth, with the object of defining the occlusal surfaces. Now, successively portions of

the occlusal rims are removed and replaced by artificial teeth:-  
the anterior teeth are of the conventional kind, while the  
posterior teeth are either tubular, i.e. completely hollow, or  
are provided with hollow cusp areas. The dentures, complete  
5 with teeth are now placed into an articulator and the teeth are  
adjusted for perfect fit and bite in a conventional manner.

Each denture composed of the final base plate and the  
conventional and hollow teeth attached thereto by means of the  
thermo-elastic occlusal rim portions, is now used to make a  
10 plaster-cast in the conventional manner, and the final denture  
is produced from a suitably colored resin, however while leaving  
the cusp spaces of the posterior teeth empty.

The step of casting the base is, however, modified  
compared with the conventional method, in that the liquid resin  
15 is poured into the cavity through a funnel into the vertically  
positioned casting die, while a riser permits gases and  
superfluous resin material to rise therethrough. This method is  
known as a method of casting metal bodies, up to now not been  
used for casting resin denture bases.

20 After curing the denture is placed into the patient's  
mouth, while the hollow teeth cusps are overfilled with a light-  
curing resin. The patient is asked to make chewing and other  
mouth movements, thereby removing the superfluous portions of

resin, whereafter the material is rapidly polymerized by passing a concentrated light source over the teeth. In this manner subsequent grinding is completely avoided, and the denture is completed in a much shorter time than before, and in a superior  
 5 quality.

I repeat that the conventional method of making dentures has been improved by me with regard to the following steps only, leaving the other steps unchanged:-

1. Preparation of the final base plate and fastening thereto the  
 10 teeth as a separate step, instead of preparing a casting die comprising both the base plate and the teeth and casting them as an integral unit, causing the baseplate itself frequently requiring grinding and adjusting owing to distortion during casting. According to my present method the baseplate is  
 15 previously made to perfectly conform to the mouth contours requiring only the teeth themselves to be suitably attached thereto and adjusted prior to the final pouring and casting operation.
2. Casting the complete denture in vertical position, in a  
 20 plaster die provided with inlet and risers, thereby preventing any deformation due to expansion or shrinking of the resin, or inclusion of blisters.



3. The use of hollow or partially hollow posterior teeth and filling of the hollow spaces with a light-curing resin, thereby accelerating the process and avoiding subsequent grinding and adjusting of the ready denture, while obtaining a close adherence to the mouth contours.
- 5

#### SHORT DESCRIPTION OF THE DRAWINGS

- Figure 1 is a plan view of a mandibular denture showing eight posterior teeth before their being filled with a light-curing resin,
- 10 Figure 2 is a vertical section through a plaster die for casting a mandibular denture,
- Figure 3 is a section of the denture of Figure 1, showing a tubular tooth with its top filled with a light-curing resin,
- Figure 4 is a section similar to that of Figure 3, but showing a partly hollowed-out tooth, and
- 15 Figure 5 is a section similar to that of Figure 3, but showing a tooth having hollow spaces at both ends.

#### DETAILED DESCRIPTION OF THE DRAWINGS

- The mandibular denture shown in Figure 1 comprises a denture base plate 1, six anterior teeth 2 of the conventional kind, and eight posterior teeth 3 and 3' according to the present invention. The posterior teeth have hollowed-out cusp portions 4 and 4' which are to be filled with a light-curing resin during
- 20

the last fitting stage and are to be polymerized in the patient's mouth by means of a strong, concentrated light source.

Figures 3, 4 and 5 show different types of artificial teeth to be attached to the lateral portions of a ready base plate as indicated in Figure 1 by the numerals 3 and 3'. They include completely tubular teeth (Figure 3) as disclosed in my Israeli Patent No. 68802; teeth hollowed out in the cusp portion only (Figure 4), and teeth hollowed-out at both ends (Figure 5). The sections show the ready base plate 1, the occlusal rim portions 5, and the hollow portions 4, to be subsequently filled with a light-curing material.

Figure 2 illustrates the forming of a complete mandibular denture in a vertical plaster die 11 which is enclosed in a casing 12. The cavity 10 in the shape of the final base plate is produced by the lost wax method in a known manner, and liquid resin is poured into this cavity through an inlet funnel 13, superfluous material being permitted to rise in the riser 14. This method ensures casting of a dense body without any air or gas inclusions, true to the shape of the pattern plate.

It will be understood that not all aforescribed novel steps should be combined in making an artificial denture, but that it may be possible to omit one or other without detriment to the outcome. On the other hand, the use of hollow or partly hollow artificial teeth for completing a denture and their filling with a light-curing material should be adhered to in order to shorten the process by one step at least.

CLAIMS :-

1. In a method of making artificial removable dentures, as defined in Israeli Patent No.68802, the steps of:

- making a final base plate of a plastic material,
- 5 attaching to said base plate an occlusal rim of a known thermo-elastic material and using the said occlusal rim in a known manner to define the occlusal surfaces,
- removing portions of said occlusal rim in successive steps and positioning artificial teeth into the thus-formed gaps, using
- 10 conventionally formed teeth as anterior teeth and teeth provided with hollow cusp portions as posterior teeth,
- casting a complete denture comprising said final base plate and said artificial teeth in a manner effecting open cavities in said posterior teeth,
- 15 filling said open cavities in said posterior teeth with a light-curing material to overflow, placing the denture into a patient's mouth and removing the superfluous light-curing material by masticating motions of the patient by rubbing contact with an opposite denture, and
- 20 polymerizing said light-curing material by a light source moved across said posterior teeth.

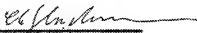
2. In the method claimed in Claim 1, the preparation of said final base plate, comprising the steps of
- making an impression of the mouth cavity,
  - making two identical provisional baseplates by vacuum
- 5 forming on said impression,
- making a pressing die by using as a pattern said two provisional base plates in contiguous alignment,
  - making a trial base plate of a translucent material in said die,
- 10 spreading a resin evenly and thinly on said trial base plate and making a final impression of the mouth cavity,
- preparing a final casting die by using as a pattern said resin-covered trial base plate, and
  - making the final base plate of a translucent plastics
- 15 material.
3. In the method as claimed in Claim 2, the step of preparing a die for casting said complete denture, comprising positioning said die with the surface of said cavity in vertical alignment, and providing an inlet funnel and a riser connecting
- 20 the uppermost portions of said cavity with the atmosphere.
4. The method of Claim 1, wherein said posterior artificial teeth are tubular having a cavity passing through their entire length.

5. The method of Claim 1, wherein said posterior artificial teeth are provided with a cavity in the cusp portion.

6. The method as claimed in Claim 1, wherein said posterior artificial teeth are provided with cavities at their both ends.

7. The method of making an artificial removable denture substantially as hereinbefore described and illustrated in the accompanying drawing.

For the Applicant,

  
E.A. Glucksman  
 Patent Attorney

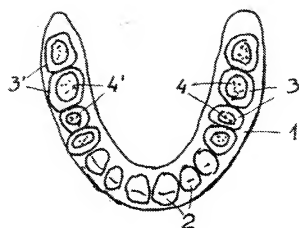


FIG. 1

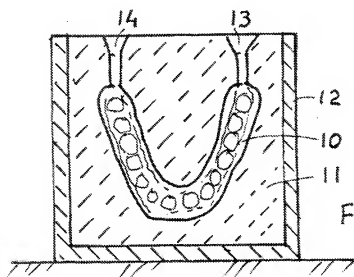


FIG. 2

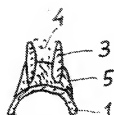


FIG. 3

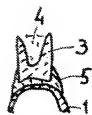


FIG. 4

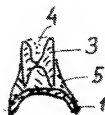


FIG. 5